WEST Search History

Hide Items | Restore | Clear | Cancel

DATE: Thursday, May 27, 2004

Hide?	Set Name	Query	Hit Count
		DB=PGPB,USPT,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR	
☐	L17	L16 and l15	67
☐	L16	sidewall	248418
☐	L15	L14 and l13	477
☐	L14	438/21-47.ccls.	5019
☐	L13	L12 and l11	7616
☐	L12	ridge or mask or stripe or three-dimensio$4	838961
☐	L11	L10 and l2	10852
☐	L10	l8 and l9	11626
☐	L9	wet or dry or chlori$4 or fluor$4 or bromine or halogen$4	2141752
☐	L8	l4 and l7	21245
☐	L7	L6 and l5 and l6	92382
☐	L6	bur$5	1197417
☐	L5	laser or (light adj emitting)	916970
☐	L4	etch$5	485868
☐	L3	gaalasn or galaasn or gaalassub	2
☐	L2	aluminum or al	4325633
☐	L1	algaas gaalas or algan or gaaln or algap or gaalp or algasn or algaasp or algassb	20726

END OF SEARCH HISTORY

WEST Search History

Hide Items | Restore | Clear | Cancel

DATE: Wednesday, May 26, 2004

Hide?	Set Name	Query	Hit Count
		DB=PGPB,USPT,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR	
☐	L20	l1 and l17	1
☐	L19	l17 and l13	6
☐	L18	L17 and l16	1
☐	L17	sidewall same(halogen or chlorine or fluroine or bromine)	1688
☐	L16	L15 and l14	103
☐	L15	wet	412083
☐	L14	l6 and l13	326
☐	L13	438/39-41.ccls.	824
☐	L12	l8 and l3	24
☐	L11	l3 and l9	3
☐	L10	l3 an dl9	23870
☐	L9	algaasp	201
☐	L8	ingaasp	8787
☐	L7	l3 and l6	33
☐	L6	bur$5	1196629
☐	L5	6498048[uref]	0
☐	L4	6498048[uref]	0
☐	L3	L2 and l1	109
☐	L2	438/21-47.ccls.	5012
☐	L1	mulpuri.xa,xp.	529

END OF SEARCH HISTORY

L13 ANSWER 1 OF 1 INSPEC (C) 2004 IEE on STN
AN 1995:5139456 INSPEC DN A9603-8160C-001; B9602-2550E-001
TI Reactive ion beam etching of aluminum indium antimonide, gallium indium antimonide heterostructures in electron cyclotron resonance methane/hydrogen/nitrogen/silicon tetrachloride discharges at room temperature.
AU Sendra, J.R.; Anguita, J.; Perez-Camacho, J.J.; Briones, F. (Inst. de Microelectonica de Madrid, Spain)
SO Applied Physics Letters (27 Nov. 1995) vol.67, no.22, p.3289-91. 15 refs.
Price: CCCC 0003-6951/95/67(22)/3289/3/$6.00
CODEN: APPLAB ISSN: 0003-6951
DT Journal
TC Experimental
CY United States
LA English
AB Reactive ion beam etching of aluminum indium antimonide, gallium indium antimonide heterostructures in electron cyclotron resonance plasma using methane/hydrogen/nitrogen/silicon tetrachloride (CH4/H2/N2/SiCl4) mixtures has been performed at room temperature. Due to the ratio of **chlorine** to methane, formation of an indium chloride layer on the etched surface is avoided, thus resulting in etched surfaces as **smooth** as the original ones and flat **mesa sidewalls**. Infrared diodes (2.3 mu m) have been fabricated using this etching technology.

DRY Etching are

CC A8160C Surface treatment and degradation of semiconductors; A6820 Solid surface structure; B2550E Surface treatment for semiconductor devices; B2530B Semiconductor junctions; B2520D II-VI and III-V semiconductors; B4250 Photoelectric devices
CT ALUMINIUM COMPOUNDS; GALLIUM COMPOUNDS; III-V SEMICONDUCTORS; INDIUM COMPOUNDS; P-I-N PHOTODIODES; SEMICONDUCTOR HETEROJUNCTIONS; SPUTTER ETCHING; SURFACE STRUCTURE
ST reactive ion etching; ECR plasma; methane; **flat mesa sidewalls**; smooth surfaces; IR diodes; heterostructures; semiconductors; p-i-n photodiodes; 293 K; AlInSb-GaInSb
CHI AlInSb-GaInSb int, AlInSb int, GaInSb int, Al int, Ga int, In int, Sb int, AlInSb ss, GaInSb ss, Al ss, Ga ss, In ss, Sb ss
PHP temperature 2.93E+02 K
ET C*H; CH4; C cp; cp; H cp; Cl*Si; SiCl4; Si cp; Cl cp; V; Al*Ga*In*Sb; Al sy 4; sy 4; Ga sy 4; In sy 4; Sb sy 4; AlInSb; Al cp; In cp; Sb cp; GaInSb; Ga cp; AlInSb-GaInSb; Al*In*Sb; Al sy 3; sy 3; In sy 3; Sb sy 3; Ga*In*Sb; Ga sy 3; Al; Ga; In; Sb

=>

121:268981 CA

Entered STN: 26 Nov 1994

Anisotropic electron cyclotron resonance etching of GaInP/AlGaInP heterostructures

AU Shul, R.J.; Schneider, R.P.; Constantine, C.

CS Sandia Natl. Lab., Albuquerque, NM, 87185, USA

SO Electronics Letters (1994), 30(10), 817-18

CODEN: ELLEAK; ISSN: 0013-5194

DT Journal

LA English

CC 76-3 (Electric Phenomena)

AB Anisotropic dry etching of GaInP/AlGaInP heterostructures was achieved in a high-ion-d. electron cyclotron resonance (ECR)-generated plasma. Structures consisting of AlInP/(GaInP/AlGaInP)/AlInP and **AlGaAs** /(GaInP/AlGaInP)/**AlGaAs** heterostructures were etched in a $CH_4/H_2/Cl_2/BCl_3/Ar$ plasma with **smooth sidewalls** and surface morphologies.

dry

ST anisotropic electron cyclotron resonance etching heterostructure

IT Etching

(anisotropic electron cyclotron resonance; of aluminum gallium indium phosphide/gallium indium phosphide heterostructures)

IT Cyclotron resonance

(in anisotropic etchin

ANSWER 11 OF 25 CA

AN   125:262395 CA

ED   Entered STN: 05 Nov 1996

TI   Reactive ion etching of AlN, **AlGaN**, and GaN using BCl3

AU   Hughes, W. C.; Rowland, W. H., Jr.; Johnson, M. A. L.; Cook, J. W., Jr.; Schetzina, J. F.

CS   Dep. Phys., North Carolina State Univ., Raleigh, NC, 27695-8202, USA

SO   Materials Research Society Symposium Proceedings (1996), 395(Gallium Nitride and Related Materials), 757-762
     CODEN: MRSPDH; ISSN: 0272-9172

PB   Materials Research Society

DT   Journal

LA   English

CC   76-3 (Electric Phenomena)

AB   This paper reports on the use of BCl3 for etching AlN and **AlGaN** in addition to GaN and the creation of structures such as mesas and lines. It also examines the potential use of KOH as a wet etchant of the nitrides. AlN, **AlGaN**, and GaN films grown by either metal-organic chemical vapor deposition (MOCVD) or mol. beam epitaxy (MBE) were patterned with Ni in 250 μm x 250 μm squares and 5 μm wide lines to create mesas and lines for typical light emitting diode (LED) or laser diode applications. Reactive ion etching was performed in a com. reactor using BCl3 pressures ranging from 5 to 30 mTorr. gas flow rates of 5 to 50 sccm and RF powers of 50 to 150 W were employed. High nitride etch rates of up to 730 Å/min. were observed but lower etch rates were needed to avoid etching of the Ni mask. **Smooth** mesa surfaces and **sidewalls** were observed in scanning electron micrographs of the etched nitride structures. Mesas as small as 5 μm x 5 μm were patterned and made in this way. Lines were also made in a similar manner as narrow as 5 μm on GAN/AlN epilayers. Subsequent wet etching of these lines showed that KOH-based solns. such as AZ400K developer attack not only AlN but also GaN depending upon the quality of the film. Possibilities for using this wet etch as a defect etchant or selective etch of nitrides on SiC are discussed.

ST   sputter etching aluminum gallium nitride

IT   Electroluminescent devices
     Etching

Dry etch

AN 124:191214 CA
ED Entered STN: 27 Mar 1996
TI Reactive ion etching GaAs and AlAs: kinetics and process monitoring
AU Franz, Gerhard; Hoyler, Charlotte; Kaindl, Josef
CS Siemens Res. Lab., Munich, D-81730, Germany
SO Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (1996), 14(1), 126-31
CODEN: JVTBD9; ISSN: 0734-211X
PB American Institute of Physics
DT Journal
LA English
CC 76-11 (Electric Phenomena)
AB The BCl3/(Ar,He) etching process for **AlGaAs** layers is described and analyzed. It was thoroughly studied whether the mechanism of plasma etching could be evaluated using the loading effect. Very **smooth sidewalls** of the structures were obtained with using an optimized process to treat the photoresist after its_development. Various end point detection methods can complement each other and enable etch depth monitoring with a depth resolution of significantly better than 50 nm at a total depth of >2.5 μm.
ST arsenide aluminum gallium RIE kinetics process; plasma etching aluminum gallium arsenide
IT Sputtering
(etching, reac

L20 ANSWER 1 OF 4 CA COPYRIGHT 2004 ACS on STN
AN 125:262395 CA
ED Entered STN: 05 Nov 1996
TI Reactive ion etching of AlN, **AlGaN**, and GaN using BCl3
AU Hughes, W. C.; Rowland, W. H., Jr.; Johnson, M. A. L.; Cook, J. W., Jr.; Schetzina, J. F.
CS Dep. Phys., North Carolina State Univ., Raleigh, NC, 27695-8202, USA
SO Materials Research Society Symposium Proceedings (1996), 395(Gallium Nitride and Related Materials), 757-762
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
CC 76-3 (Electric Phenomena)
AB This paper reports on the use of BCl3 for etching AlN and **AlGaN** in addition to GaN and the creation of structures such as mesas and lines. It also examines the potential use of KOH as a **wet** etchant of the nitrides. AlN, **AlGaN**, and GaN films grown by either metal-organic chemical vapor deposition (MOCVD) or mol. beam epitaxy (MBE) were patterned with Ni in 250 μm x 250 μm squares and 5 μm wide lines to create mesas and lines for typical light emitting diode (LED) or laser diode applications. Reactive ion etching was performed in a com. reactor using BCl3 pressures ranging from 5 to 30 mTorr. gas flow rates of 5 to 50 sccm and RF powers of 50 to 150 W were employed. High nitride etch rates of up to 730 Å/min. were observed but lower etch rates were needed to avoid etching of the Ni mask. **Smooth** mesa surfaces and **sidewalls** were observed in scanning electron micrographs of the etched nitride structures. Mesas as small as 5 μm x 5 μm were patterned and made in this way. Lines were also made in a similar manner as narrow as 5 μm on GAN/AlN epilayers. Subsequent **wet** etching of these lines showed that KOH-based solns. such as AZ400K developer attack not only AlN but also GaN depending upon the quality of the film. Possibilities for using this **wet** etch as a defect etchant or selective etch of nitrides on SiC are discussed.
ST sputter etching aluminum gallium nitride
IT Electroluminescent devices
Etching
Kinetics of etching
(reactive ion etching of AlN, **AlGaN**, and GaN using BCl3)
IT Sputtering
(etching, reactive ion etching of AlN, **AlGaN**, and GaN using BCl3)
IT Lasers
(semiconductor, reactive ion etching of AlN, **AlGaN**, an

```
FILE 'INSPEC' ENTERED AT 19:02:25 ON 26 MAY 2004
L1            271 MEAS
L2           3652 MESA
L3         569187 4
L4          18094 WET
L5          30981 CHLORINE OR FLUORINE OR BROMINE
L6              0 HLAOGEN#####
L7           8337 HALOGEN#######
L8            482 ALGAASP OR ALGASN OR INGAALAS
L9         353254 LASER OR LIGHT ADJ EMITTING
L10             0 LIGHT ADJ EMITTING
L11           283 SMOOTH##### (10A)SIDEWALL#
L12            25 L11 (P)(L5 OR L7)
L13             1 L2 AND L12

FILE 'CA' ENTERED AT 19:08:19 ON 26 MAY 2004
L14            15 L12
L15         20547 ALGAN OR ALGAAS OR GAALN OR GAALAS GAALP OR ALGAP
L16         20853 L8 OR L15
L17            25 L16 AND L11
L18             0 L1 AND L17
L19            18 DHIS
L20             4 L4 AND L17

FILE 'INSPEC' ENTERED AT 19:37:13 ON 26 MAY 2004
L21         37897 L5 OR L7
L22           110 L16 AND L21
L23         23324 STRIPE OR RIDGE OR MEAS
L24          3652 MESA
L25         26611 L23 OR L24
L26             9 L25 AND L22
L27             3 L26 AND L4

=>
```

L27 ANSWER 1 OF 3 INSPEC (C) 2004 IEE on STN
AN 1991:3846457 INSPEC DN A91047406; B91025564
TI Electron-beam lithography and chemically assisted ion beam etching for the fabrication of grating surface-emitting broad-area **AlGaAs** lasers.
AU Tiberio, R.C.; Porkolab, G.A.; Johnson, J.E.; Grande, W.J.; Rathbun, L.C.; Wolf, E.D.; Craighead, H.G. (Nat. Nanofabrication Facility, Cornell Univ., Ithaca, NY, USA); Lang, R.J.; Larsson, A.; Forouhar, S.; Cody, J.
SO Journal of Vacuum Science & Technology B (Microelectronics Processing and Phenomena) (Nov.-Dec. 1990) vol.8, no.6, p.1408-11. 27 refs.
Price: CCCC 0734-211X/90/061408-04$01.00
CODEN: JVTBD9 ISSN: 0734-211X
Conference: 34th International Symposium on Electron, Ion and Photon Beams. San Antonio, TX, USA, 29 May-1 June 1990
DT Conference Article; Journal
TC Practical; Experimental
CY United States
LA English
AB The authors report on the fabrication and characterization of broad-area, grating-coupled, distributed Bragg reflector, surface-emitting, **AlGaAs**/GaAs laser diodes. Electron-beam lithography and chemically assisted ion-beam etching (CAIBE) were used to fabricate both first-order (120-nm period) and second-order (240-nm period) gratings. Gratings were patterned by exposing PMMA resist using 50-keV electrons in a JEOL 5DIIU direct write electron-beam lithography system. The resist image was transferred into the **AlGaAs** layer by CAIBE. CAIBE was performed using **chlorine** gas in conjunction with a 500-eV argon-ion beam in a modified Technics Plasma GmbH RIB 160 etcher. Surface-emitting lasers using second-order gratings were fabricated on **AlGaAs**/GaAs asymmetric separate confinement double heterostructure layers grown by liquid-phase epitaxy. **Wet** chemical etching was used to remove the upper cladding layer, exposing the waveguide in selected areas. Gratings were then etched into the waveguide to produce surface emitting window regions. The far-field light intensity pattern shows a lateral angular spread of 2.4 degrees for a 50- mu m-wide **stripe**. This lateral angular distribution is the lowest reported for a broad-area (not array) grating surface-emitter.
CC A4260B Design of specific laser systems; A4255P Lasing action in semiconductors with junctions; A8160C Semiconductors; A6855 Thin film growth, structure, and epitaxy; A8115L Deposition from liquid phases (melts and solutions); B4320J Semiconductor junction lasers; B2550G Lithography; B2550E Surface treatment and oxide film formation; B0510D Epitaxial growth
CT ALUMINIUM COMPOUNDS; DISTRIBUTED BRAGG REFLECTOR LASERS; ELECTRON BEAM LITHOGRAPHY; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; LIQUID PHASE EPITAXIAL GROWTH; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR JUNCTION LASERS; SPUTTER ETCHING
ST broad-area grating-coupled lasers; III-V semiconductors; DBR lasers; surface emitting lasers; first-order gratings; second-order gratings; chemically assisted ion beam etching; PMMA resist; JEOL 5DIIU direct write electron-beam lithography system; CAIBE; Technics Plasma GmbH RIB 160 etcher; separate confinement double heterostructure layers; liquid-phase epitaxy; surface emitting window regions; far-field light intensity pattern; lateral angular spread; **AlGaAs-GaAs lasers**
CHI AlGaAs-GaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin
ET Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; cp; Ga cp; As cp; As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; V; AlGaAs-GaAs; Al; As; Ga

L27 ANSWER 2 OF 3 INSPEC (C) 2004 IEE on STN
AN 1988:3070495 INSPEC DN A88028200; B88013135
TI GaAs and **AlGaAs** crystallographic etching with low-pressure **chlorine** radicals in an ultrahigh-vacuum system.

AU Sugata, S.; Asakawa, K. (Optoelectron. Joint Res. Lab., Kawasaki, Japan)
SO Journal of Vacuum Science & Technology B (Microelectronics Processing and Phenomena) (July-Aug. 1987) vol.5, no.4, p.894-901. 11 refs.
Price: CCCC 0734-211X/87/040894-08$01.00
CODEN: JVTBD9 ISSN: 0734-211X
DT Journal
TC Experimental
CY United States
LA English
AB GaAs and **AlGaAs** have been crystallographically etched with low-pressure **chlorine** radicals in an electron-cyclotron resonance (ECR) plasma shower with a new reactive-ion-beam etching (RIBE) system for obtaining damage- and contamination-free etching. The etching begins abruptly at 190 degrees C and increases gradually above 200 degrees C. The typical etching rate of a (001) plane is 1 mu m/min at a substrate temperature of 300 degrees C. **Mesa**-shaped and reverse **mesa**-shaped grooves with (111)A side wall planes are obtained for (110)- and (110)-oriented line and space masks. For square masks with (110) edge lines, on the other hand, high aspect-ratio columns with (100) vertical side wall planes are obtained. These results show that the etching rate of (111)A is much lower than that of (100), (110), or (111)B. **AlGaAs** is etched similarly to GaAs. Cl2 gas (not plasma excited) performs similar etching. However, the substrate temperature must be about 100 degrees C higher for the beginning of etching than for the Cl radical etching. These etching technologies are promising for microfabrication of GaAs/**AlGaAs** optoelectronic devices, replacing conventional **wet** chemical etching.

dry vs. wet

CC ~~A8160C Semiconductors~~; B2520D II-VI and III-V semiconductors; B2550E Surface treatment and oxide film formation; B2550G Lithography
CT ALUMINIUM COMPOUNDS; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; SPUTTER ETCHING
ST III-V semiconductors; electron cyclotron resonance plasma; line masks; crystallographic etching; ultrahigh-vacuum system; reactive-ion-beam etching; etching rate; substrate temperature; **mesa-shaped grooves** ; space masks; high aspect-ratio columns; microfabrication; optoelectronic devices; 190 to 300 degC; GaAs; **AlGaAs**; low pressure Cl radicals
CHI Cl el; GaAs sur, As sur, Ga sur, GaAs bin, As bin, Ga bin; AlGaAs sur, Al sur, As sur, Ga sur, AlGaAs ss, Al ss, As ss, Ga ss
PHP temperature 4.63E+02 to 5.73E+02 K
ET As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; C; Cl2; Cl; V; As; Ga; Al

L27 ANSWER 3 OF 3 INSPEC (C) 2004 IEE on STN
AN 1988:3029963 INSPEC DN A88006324; B88002218
TI Nonselective etching of GaAs/**AlGaAs** double heterostructure laser facets by Cl2 reactive ion etching in a load-locked system.
AU Vawter, G.A.; Coldren, L.A.; Merz, J.L.; Hu, E.L. (Dept. of Electr. & Comput. Eng., California Univ., Santa Barbara, CA, USA)
SO Applied Physics Letters (7 Sept. 1987) vol.51, no.10, p.719-21. 9 refs.
Price: CCCC 0003-6951/87/360719-03$01.00
CODEN: APPLAB ISSN: 0003-6951
DT Journal
TC New Development; Experimental
CY United States
LA English
AB Reactive ion etching was used for etching laser facets of GaAs/**AlGaAs** transverse junction **stripe** lasers. A new load-locked reactive ion etching system was developed to dramatically reduce the background partial pressure of O2 and H2O in the chamber, substantially reducing the oxidation of **AlGaAs** and permitting equal rate etching of GaAs and **AlGaAs** with smooth vertical facets. Etching is performed with a **chlorine** plasma at a low pressure (0.5 mTorr), and bias voltage (-350 V) at a rate of approximately 850 AA/min. This simple, single-step dry etching process is suitable for

optoelectronic integration and eliminates the requirement of unreliable **wet** chemical etching or microcleaving techniques. This new system is used to fabricate transverse junction **stripe** lasers with facet reflectivities of more than 16%. These high quality dry etched facets result in only a 7.5% increase of the threshold current above that of lasers with cleaved facets.

CC A4255P Lasing action in semiconductors with junctions; A4260B Design of specific laser systems; B4320J Semiconductor junction lasers

CT ALUMINIUM COMPOUNDS; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; SEMICONDUCTOR JUNCTION LASERS; SPUTTER ETCHING

ST nonselective etching; fabrication; double heterostructure laser facets; **transverse junction stripe lasers**; load-locked reactive ion etching; dry etching; facet reflectivities; Cl2; **GaAs-AlGaAs**

CHI GaAs-AlGaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin; Cl2 el, Cl el

ET As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; Cl2; O2; H*O; H2O; H cp; O cp; V; GaAs-AlGaAs; Al; As; Ga; Cl

=> d his

ANSWER 6 OF 9 INSPEC (C) 2004 IEE on STN

AN 1994:4581373 INSPEC DN A9405-8115H-021; B9403-0510D-018

TI Selective metalorganic chemical vapor deposition growth of GaAs on **AlGaAs** combined with in situ HCl gas etching.

AU Kizuki, H.; Hayafuji, N.; Fujii, N.; Kaneno, N.; Mihashi, Y.; Murotani, T. (Optoelectronic & Microwave Devices Lab., Mitsubishi Electr. Corp., Hyogo, Japan)

SO Journal of Crystal Growth (Nov. 1993) vol.134, no.1-2, p.35-42. 13 refs.
Price: CCCC 0022-0248/93/$06.00
CODEN: JCRGAE ISSN: 0022-0248

DT Journal

TC Experimental

CY Netherlands

LA English

AB Selective metalorganic chemical vapor deposition (MOCVD) growth of GaAs onAl0.48Ga0.52As combined with in situ HCl gas etching was investigated. In the case that **AlGaAs** surface was oxidized prior to the in situ HCl gas etching, accumulation of both oxygen and **chlorine** were found at the GaAs/**AlGaAs** regrowth interface. The dislocation density in the regrown GaAs layer was also increased to over 1*108 cm-2 by the existence of the accumulated oxygen and **chlorine** . The high quality GaAs regrown layer on **AlGaAs** with low dislocation density of 4.2*104 cm-2 was obtained by using the GaAs cap layer to prevent the oxidation of **AlGaAs** surface, and by the adequate AsH3 flow rate during the HCl gas etching. It was also found that the complete removal of surface oxide on the GaAs cap layer just prior to the HCl gas etching makes perfect reduction of the accumulation of oxygen and **chlorine** at the GaAs/**AlGaAs** regrowth interface.
The buried **ridge** waveguide laser fabrication was successfully demonstrated by the selective MOCVD growth combined with the in situ HCl gas etching.

CC A8115H Chemical vapour deposition; A6855 Thin film growth, structure, and epitaxy; A8160C Semiconductors; A6170J Etch pits, decoration, transmission electron-microscopy and other direct observations of dislocations; A4260B Design of specific laser systems; A4255P Lasing action in semiconductors with junctions; B0510D Epitaxial growth; B2520D II-VI and III-V semiconductors; B2550E Surface treatment; B4320J Semiconductor junction lasers

CT ALUMINIUM COMPOUNDS; DISLOCATION DENSITY; ETCHING; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR LASERS;

L26 ANSWER 1 OF 9 INSPEC (C) 2004 IEE on STN
AN 2004:7846061 INSPEC DN B2004-03-2530C-018
TI Preparation of optoelectronic devices based on AlN/**AlGaN** superlattices.
AU Holtz, M. (Dept. of Phys., Texas Tech. Univ., Lubbock, TX, USA); Kipshidze, G.; Chandolu, A.; Yun, J.; Borisov, B.; Kuryatkov, V.; Zhu, K.; Chu, S.N.G.; Nikishin, S.A.; Temkin, H.
SO Progress in Semiconductors II - Electronic and Optoelectronic Applications. Symposium (Mater. Res. Soc. Symposium Proceedings Vol.744)
Editor(s): Weaver, B.D.; Manasreh, M.O.; Jagadish, C.; Zoller, S.
Warrendale, PA, USA: Mater. Res. Soc, 2003. p.621-6 of xvii+680 pp. 17 refs.
Conference: Boston, MA, USA, 2-5 Dec 2002
ISBN: 1-55899-681-8
DT Conference Article
TC Practical; Experimental
CY United States
LA English
AB We present results on growth and fabrication experiments of AlN/ **AlGaN** superlattices for ultraviolet (UV) optoelectronic devices. Superlattices with extremely short periods have been studied. The AlN "barrier" layers are 0.5 nm thick, and the AlxGa1-xN "wells" are 1.25 nm thick, with x 0.08. This combination gives an average AlN mole fraction of 0.63 across one full period. The superlattice periods, AlN mole fractions, and energy gaps are determined using TEM, X-ray diffraction, and optical reflectance. They are all consistent with each other. For device fabrication, p-i-n structures are grown doped with Si (n-type) and Mg (p-type). The acceptor activation energy of 0.2 eV is found. **Mesa** structures are plasma etched using **chlorine** chemistry. Etch rates of AlN are 1/3 those of GaN under identical circumstances. Etch rates of 250 nm/min are used for the device structures. A light emitting diode, with primary emission at 280 nm is reported, and a detector with sensitivity edge at 260 nm are reported.
CC B2530C Semiconductor superlattices, quantum wells and related structures; B4260D Light emitting diodes; B2550B Semiconductor doping; B2550E Surface treatment (semiconductor technology); B0520D Vacuum deposition; B4220 Luminescent materials
CT ALUMINIUM COMPOUNDS; ELECTROLUMINESCENCE; ELEMENTAL SEMICONDUCTORS; ENERGY GAP; GALLIUM COMPOUNDS; III-V SEMICONDUCTORS; INTERFACE STRUCTURE; LIGHT EMITTING DIODES; MAGNESIUM; MOLECULAR BEAM EPITAXIAL GROWTH; PHOTOREFLECTANCE; PLASMA MATERIALS PROCESSING; ROUGH SURFACES; SEMICONDUCTOR DOPING; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR SUPERLATTICES; SILICON; SPUTTER ETCHING; SURFACE TOPOGRAPHY; TRANSMISSION ELECTRON MICROSCOPY; WIDE BAND GAP SEMICONDUCTORS; X-RAY DIFFRACTION
ST ultraviolet optoelectronic devices; **AlN/AlGaN superlattices growth** ; UV optoelectronic devices structures; AlN barrier layers; AlxGa1-xN wells; mole fraction; energy gaps; TEM; transmission electron microscopy; X-ray diffraction; optical reflectance; p-i-n structures; n type Si doping; p type Mg doping; acceptor activation energy; **Mesa structures**; plasma etching; **chlorine chemistry**; etch rates; light emitting diode; detector sensitivity; primary emission; 0.5 nm; 280 nm; 260 nm; 1.25 nm; **AlN-AlGaN**
CHI AlN-AlGaN int, AlGaN int, AlN int, Al int, Ga int, N int, AlGaN ss, Al ss, Ga ss, N ss, AlN bin, Al bin, N bin
PHP size 5.0E-10 m; wavelength 2.8E-07 m; wavelength 2.6E-07 m; size 1.25E-09 m
ET Al*N; AlN; Al cp; cp; N cp; Al*Ga*N; Al sy 3; sy 3; Ga sy 3; N sy 3; AlGaN; Ga cp; AlxGa1-xN; Si; Mg; Ga*N; GaN; V; AlN-AlGaN; Al; Ga

L26 ANSWER 2 OF 9 INSPEC (C) 2004 IEE on STN
AN 2003:7562670 INSPEC DN A2003-09-8160C-001; B2003-04-2550E-064
TI Plasma etching of AlN/AlGaInN superlattices for device fabrication.

AU Zhu, K.; Kuryatkov, V.; Borisov, B.; Kipshidze, G.; Nikishin, S.A.; Temkin, H. (Dept. of Electr. Eng., Texas Tech Univ., Lubbock, TX, USA); Holtz, M.

SO Applied Physics Letters (16 Dec. 2002) vol.81, no.25, p.4688-90. 18 refs.
Doc. No.: S0003-6951(02)03149-2
Published by: AIP
Price: CCCC 01/03/6951/2002/81(25)/4688(3)/$19.00
CODEN: APPLAB ISSN: 0003-6951
SICI: 0003-6951(20021216)81:25L.4688:PEAS;1-0

DT Journal

TC Experimental

CY United States

LA English

AB We report a study of plasma etching of GaN, AlN, and AlN/**AlGaN** superlattices for the processing of deep ultraviolet light emitting diodes. Etching was carried out using inductively coupled plasma of **chlorine** diluted with argon under reactive ion etching conditions. Using parameters selected for etch rate, anisotropy, and surface smoothness, we study etching of n- and p-type superlattices. The former etches at a rate of 250 nm/min, which is intermediate to that of AlN and GaN, while the latter exhibits a slower etch rate of 60 nm/min. Based on these studies, we prepare low-leakage p-n junctions and **mesa** light emitting diodes with peak emission at 280 nm.

CC A8160C Surface treatment and degradation in semiconductor technology; A5275R Plasma applications in manufacturing and materials processing; A6865 Low-dimensional structures: growth, structure and nonelectronic properties; B2550E Surface treatment (semiconductor technology); B2530C Semiconductor superlattices, quantum wells and related structures; B2520D II-VI and III-V semiconductors; B4260D Light emitting diodes

CT ALUMINIUM COMPOUNDS; GALLIUM COMPOUNDS; III-V SEMICONDUCTORS; INDIUM COMPOUNDS; LIGHT EMITTING DIODES; SEMICONDUCTOR SUPERLATTICES; SPUTTER ETCHING; WIDE BAND GAP SEMICONDUCTORS

ST AlN/AlGaInN superlattice; device fabrication; deep ultraviolet light emitting diode; inductively coupled plasma etching; reactive ion etching; p-n junction; **mesa LED**; 280 nm; AlN-AlGaInN

CHI AlN-AlGaInN int, AlGaInN int, AlN int, Al int, Ga int, In int, N int, AlGaInN ss, Al ss, Ga ss, In ss, N ss, AlN bin, Al bin, N bin

PHP wavelength 2.8E-07 m

ET Al*N; AlN; Al cp; cp; N cp; Al*Ga*In*N; Al sy 4; sy 4; Ga sy 4; In sy 4; N sy 4; AlGaInN; Ga cp; In cp; Ga*N; GaN; Al*Ga*N; Al sy 3; sy 3; Ga sy 3; N sy 3; AlGaN; V; AlN-AlGaInN; Al; Ga; In

L26 ANSWER 3 OF 9 INSPEC (C) 2004 IEE on STN

AN 2000:6706162 INSPEC DN A2000-20-7860F-021; B2000-10-4260-016

TI Electroluminescent device based on AlxGa1-xAs-GaAs quantum well nanostructures.

AU Manimaran, M. (Joint Res. Centre for Atom Technol., Ibaraki, Japan); Vaya, P.R.; Kanayama, T.

SO Optical and Quantum Electronics (Oct. 2000) vol.32, no.10, p.1191-9. 12 refs.
Published by: Kluwer Academic Publishers
Price: CCCC 0306-8919/2000/$18.00
CODEN: OQELDI ISSN: 0306-8919
SICI: 0306-8919(200010)32:10L.1191:EDBA;1-H

DT Journal

TC Practical; Experimental

CY Netherlands

LA English

AB **AlGaAs**-GaAs based quantum well nanopillar arrays are fabricated by using UV lithography and **chlorine** based reactive ion etching. The nanostructure is fabricated so as to get the confinement of carriers within the i-GaAs quantum well layer with thickness of 9 nm sandwiched between two barrier layers of Al0.33Ga0.67As with thickness 11 nm in order to induce possible light emission from the quantum well region. The size

of pillars is obtained from SEM analysis. The number of pillars available within the 1 mu m2 **mesa** size is found to be around 400 having a pillar size between 10 and 50 nm. Electroluminescence (EL) is detected from the nanopillars when applying a forward bias voltage of >or=1.3 V and the emitted light is observed at around 830 nm.

CC A7860F Electroluminescence (condensed matter); A4285D Optical fabrication, surface grinding; A7865K Optical properties of III-V and II-VI semiconductors (thin films/low-dimensional structures); B4260 Electroluminescent devices; B2550N Nanometre-scale semiconductor fabrication technology

CT ALUMINIUM COMPOUNDS; ELECTROLUMINESCENCE; ELECTROLUMINESCENT DEVICES; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; NANOSTRUCTURED MATERIALS; NANOTECHNOLOGY; OPTICAL FABRICATION; SCANNING ELECTRON MICROSCOPY; SEMICONDUCTOR QUANTUM WELLS; SPUTTER ETCHING; ULTRAVIOLET LITHOGRAPHY

ST electroluminescent device; AlxGa1-xAs-GaAs quantum well nanostructures; **AlGaAs-GaAs based quantum well nanopillar arrays**; UV lithography; **chlorine based reactive ion etching**; carrier confinement; i-GaAs quantum well layer; light emission; SEM analysis; electroluminescence; 9 to 50 nm; 1.3 V; 830 nm; **AlGaAs-GaAs**

CHI AlGaAs-GaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin

PHP size 9.0E-09 to 5.0E-08 m; voltage 1.3E+00 V; wavelength 8.3E-07 m

ET Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlxGa1-xAs; Al cp; cp; Ga cp; As cp; GaAs; AlxGa1-xAs-GaAs; AlGaAs; AlGaAs-GaAs; As*Ga; As sy 2; sy 2; Ga sy 2; Al0.33Ga0.67As; V; Al; As; Ga

L26 ANSWER 4 OF 9 INSPEC (C) 2004 IEE on STN

AN 1999:6402019 INSPEC DN A1999-24-8115H-010; B1999-12-0520F-091

TI Flow modulation epitaxial lateral overgrowth of gallium nitride on masked 6H-silicon carbide and sapphire surfaces.

AU Smart, J.A.; Chumbes, E.M.; Srivatsa, L.N.; Lo, Y.H.; Shealy, J.R. (Sch. of Electr. Eng., Cornell Univ., Ithaca, NY, USA)

SO Wide-Bandgap Semiconductors for High Power, High Frequency and High Temperature. Symposium
Editor(s): DenBaars, S.; Palmour, J.; Shur, M.; Spencer, M.
Warrendale, PA, USA: Mater. Res. Soc, 1998. p.59-64 of xiii+565 pp. 9 refs.
Conference: San Francisco, CA, USA, 13-15 April 1998
ISBN: 1-55899-418-1

DT Conference Article

TC Experimental

CY United States

LA English

AB Selective Area Flow Modulation Epitaxial growth of GaN is carried out in a low pressure Organometallic Vapor Phase Epitaxy reactor. This process is known to enhance reactant surface migration lengths on patterned group III-arsenide and phosphide growth surfaces. With this process, high quality laterally overgrown GaN epitaxial materials result. Under the ammonia rich growth conditions used, enhanced migration (by flux modulation) across masked regions of the substrate has not been observed. The mask materials were silicon dioxide and silicon nitride, both deposited on GaN/**AlGaN** buffer structures on sapphire and SiC substrates. Window stripes were patterned parallel and perpendicular to the (1100) crystal directions to observe the orientation dependence of the lateral growth rate. Structures exhibited heights above the mask surface as large as 30 microns and atomically smooth surfaces. With a periodic array of **stripe** window openings in the mask, planarized laterally overgrown surfaces are achieved after roughly 4 microns of overgrowth. Chemical assisted ion beam etching with **chlorine** gas was used to delineate defects in the selectively grown layers. Additional evidence on the defect reduction is given by Atomic Force and Scanning Transmission Electron microscopy.

CC A8115H Chemical vapour deposition; A6855 Thin film growth, structure, and epitaxy; A5275R Plasma applications in manufacturing and materials

processing; A6820 Solid surface structure; A8160C Surface treatment and degradation in semiconductor technology; A6170 Defects in crystals; B0520F Chemical vapour deposition; B2520D II-VI and III-V semiconductors; B2550G Lithography (semiconductor technology); B2550E Surface treatment (semiconductor technology)

CT ATOMIC FORCE MICROSCOPY; CRYSTAL DEFECTS; ETCHING; GALLIUM COMPOUNDS; III-V SEMICONDUCTORS; MASKS; MOCVD; SCANNING-TRANSMISSION ELECTRON MICROSCOPY; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SPUTTER ETCHING; SURFACE TOPOGRAPHY; VAPOUR PHASE EPITAXIAL GROWTH; WIDE BAND GAP SEMICONDUCTORS

ST flow modulation epitaxial lateral overgrowth; gallium nitride; masked 6H-silicon carbide; sapphire surfaces; selective area flow modulation epitaxial growth; low pressure organometallic vapor phase epitaxy reactor; reactant surface migration lengths; high quality laterally overgrown GaN epitaxial materials; ammonia rich growth conditions; enhanced migration; flux modulation; silicon dioxide; silicon nitride; **GaN/AlGaN buffer structures**; window stripes; orientation dependence; lateral growth rate; atomically smooth surfaces; periodic array; planarized laterally overgrown surfaces; chemical assisted ion beam etching; **chlorine gas**; atomic force microscopy; scanning transmission electron microscopy; 30 mum; GaN; SiC; Al2O3; SiO2; Si3N4

CHI GaN int, Ga int, N int, GaN bin, Ga bin, N bin; SiC sur, Si sur, C sur, SiC bin, Si bin, C bin; Al2O3 sur, Al2 sur, Al sur, O3 sur, O sur, Al2O3 bin, Al2 bin, Al bin, O3 bin, O bin; SiO2 int, O2 int, Si int, O int, SiO2 bin, O2 bin, Si bin, O bin; Si3N4 int, Si3 int, N4 int, Si int, N int, Si3N4 bin, Si3 bin, N4 bin, Si bin, N bin

PHP size 3.0E-05 m

ET H; 6H; is; H is; Ga*N; GaN; Ga cp; cp; N cp; Al*Ga*N; Al sy 3; sy 3; Ga sy 3; N sy 3; AlGaN; Al cp; C*Si; SiC; Si cp; C cp; V; Al*O; Al2O3; O cp; O*Si; SiO2; N*Si; Si3N4; Ga; Si; C; Al2O; Al; O; SiO; Si3N; N

L26 ANSWER 5 OF 9 INSPEC (C) 2004 IEE on STN

AN 1997:5698960 INSPEC DN A9721-4278-001; B9711-4320M-002

TI GaAs/**AlGaAs ridge** lasers with etched mirrors formed by an inductively coupled plasma reactor.

AU Horst, S.C.; Agarwala, S.; King, O.; Fitz, J.L.; Smith, S.D. (Lab. for Phys. Sci., Maryland Univ., College Park, MD, USA)

SO Applied Physics Letters (15 Sept. 1997) vol.71, no.11, p.1444-5. 8 refs.
Doc. No.: S0003-6951(97)04337-4
Published by: AIP
Price: CCCC 0003-6951/97/71(11)/1444/2/$10.00
CODEN: APPLAB ISSN: 0003-6951
SICI: 0003-6951(19970915)71:11L.1444:GARL;1-Z

DT Journal

TC Experimental

CY United States

LA English

AB Etched mirrors for semiconductor lasers are necessary for optoelectronic integrated circuit applications. This letter reports on the use of an inductively coupled plasma (ICP) reactor to create etched mirrors on GaAs/**AlGaAs ridge** lasers. Etch chemistries consisting of boron trichloride and **chlorine** were used to achieve both smooth and vertical mirror surfaces. Optical measurements indicate that devices fabricated with ICP etched mirrors are comparable to devices formed by cleaved mirrors.

CC A4278C Optical lens and mirror design; A4255P Lasing action in semiconductors; A8160C Surface treatment and degradation of semiconductors; B4320M Laser accessories and instrumentation; B4320J Semiconductor lasers; B2550E Surface treatment for semiconductor devices; B4270 Integrated optoelectronics

CT ALUMINIUM COMPOUNDS; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; INTEGRATED OPTOELECTRONICS; LASER MIRRORS; QUANTUM WELL LASERS; SPUTTER ETCHING

ST **ridge lasers**; etched mirrors; inductively coupled plasma reactor; semiconductor lasers; optoelectronic integrated circuits; smooth

surfaces; vertical surfaces; **GaAs-AlGaAs**
CHI GaAs-AlGaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin
ET As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; V; GaAs-AlGaAs; Al; As; Ga

L26 ANSWER 6 OF 9 INSPEC (C) 2004 IEE on STN
AN 1994:4581373 INSPEC DN A9405-8115H-021; B9403-0510D-018
TI Selective metalorganic chemical vapor deposition growth of GaAs on **AlGaAs** combined with in situ HCl gas etching.
AU Kizuki, H.; Hayafuji, N.; Fujii, N.; Kaneno, N.; Mihashi, Y.; Murotani, T. (Optoelectronic & Microwave Devices Lab., Mitsubishi Electr. Corp., Hyogo, Japan)
SO Journal of Crystal Growth (Nov. 1993) vol.134, no.1-2, p.35-42. 13 refs.
Price: CCCC 0022-0248/93/$06.00
CODEN: JCRGAE ISSN: 0022-0248
DT Journal
TC Experimental
CY Netherlands
LA English
AB Selective metalorganic chemical vapor deposition (MOCVD) growth of GaAs onAl0.48Ga0.52As combined with in situ HCl gas etching was investigated. In the case that **AlGaAs** surface was oxidized prior to the in situ HCl gas etching, accumulation of both oxygen and **chlorine** were found at the GaAs/**AlGaAs** regrowth interface. The dislocation density in the regrown GaAs layer was also increased to over 1*108 cm-2 by the existence of the accumulated oxygen and **chlorine** .. The high quality GaAs regrown layer on **AlGaAs** with low dislocation density of 4.2*104 cm-2 was obtained by using the GaAs cap layer to prevent the oxidation of **AlGaAs** surface, and by the adequate AsH3 flow rate during the HCl gas etching. It was also found that the complete removal of surface oxide on the GaAs cap layer just prior to the HCl gas etching makes perfect reduction of the accumulation of oxygen and **chlorine** at the GaAs/**AlGaAs** regrowth interface.
The buried **ridge** waveguide laser fabrication was successfully demonstrated by the selective MOCVD growth combined with the in situ HCl gas etching.
CC A8115H Chemical vapour deposition; A6855 Thin film growth, structure, and epitaxy; A8160C Semiconductors; A6170J Etch pits, decoration, transmission electron-microscopy and other direct observations of dislocations; A4260B Design of specific laser systems; A4255P Lasing action in semiconductors with junctions; B0510D Epitaxial growth; B2520D II-VI and III-V semiconductors; B2550E Surface treatment; B4320J Semiconductor junction lasers
CT ALUMINIUM COMPOUNDS; DISLOCATION DENSITY; ETCHING; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR LASERS; VAPOUR PHASE EPITAXIAL GROWTH
ST selective metalorganic chemical vapor deposition growth; **GaAs/AlGaAs regrowth interface**; dislocation density; GaAs cap layer; oxidation; **buried ridge waveguide laser fabrication**; GaAs; in situ HCl gas etching; Al0.48Ga0.52As; **AlGaAs surface**; AsH3 flow rate; **GaAs-AlGaAs**
CHI GaAs-AlGaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin; GaAs sur, As sur, Ga sur, GaAs bin, As bin, Ga bin; HCl bin, Cl bin, H bin; Al0.48Ga0.52As sur, Al0.48 sur, Ga0.52 sur, Al sur, As sur, Ga sur, Al0.48Ga0.52As ss, Al0.48 ss, Ga0.52 ss, Al ss, As ss, Ga ss; AlGaAs sur, Al sur, As sur, Ga sur, AlGaAs ss, Al ss, As ss, Ga ss; AsH3 bin, As bin, H3 bin, H bin
ET As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; Cl*H; HCl; H cp; Cl cp; Al0.48Ga0.52As; As*H; AsH3; V; GaAs-AlGaAs; Al; As; Ga; Cl; AsH; H

L26 ANSWER 7 OF 9 INSPEC (C) 2004 IEE on STN
AN 1991:3846457 INSPEC DN A91047406; B91025564

TI Electron-beam lithography and chemically assisted ion beam etching for the fabrication of grating surface-emitting broad-area **AlGaAs** lasers.
AU Tiberio, R.C.; Porkolab, G.A.; Johnson, J.E.; Grande, W.J.; Rathbun, L.C.; Wolf, E.D.; Craighead, H.G. (Nat. Nanofabrication Facility, Cornell Univ., Ithaca, NY, USA); Lang, R.J.; Larsson, A.; Forouhar, S.; Cody, J.
SO Journal of Vacuum Science & Technology B (Microelectronics Processing and Phenomena) (Nov.-Dec. 1990) vol.8, no.6, p.1408-11. 27 refs.
Price: CCCC 0734-211X/90/061408-04$01.00
CODEN: JVTBD9 ISSN: 0734-211X
Conference: 34th International Symposium on Electron, Ion and Photon Beams. San Antonio, TX, USA, 29 May-1 June 1990
DT Conference Article; Journal
TC Practical; Experimental
CY United States
LA English
AB The authors report on the fabrication and characterization of broad-area, grating-coupled, distributed Bragg reflector, surface-emitting, **AlGaAs**/GaAs laser diodes. Electron-beam lithography and chemically assisted ion-beam etching (CAIBE) were used to fabricate both first-order (120-nm period) and second-order (240-nm period) gratings. Gratings were patterned by exposing PMMA resist using 50-keV electrons in a JEOL 5DIIU direct write electron-beam lithography system. The resist image was transferred into the **AlGaAs** layer by CAIBE. CAIBE was performed using **chlorine** gas in conjunction with a 500-eV argon-ion beam in a modified Technics Plasma GmbH RIB 160 etcher. Surface-emitting lasers using second-order gratings were fabricated on **AlGaAs**/GaAs asymmetric separate confinement double heterostructure layers grown by liquid-phase epitaxy. Wet chemical etching was used to remove the upper cladding layer, exposing the waveguide in selected areas. Gratings were then etched into the waveguide to produce surface emitting window regions. The far-field light intensity pattern shows a lateral angular spread of 2.4 degrees for a 50- mu m-wide **stripe**. This lateral angular distribution is the lowest reported for a broad-area (not array) grating surface-emitter.
CC A4260B Design of specific laser systems; A4255P Lasing action in semiconductors with junctions; A8160C Semiconductors; A6855 Thin film growth, structure, and epitaxy; A8115L Deposition from liquid phases (melts and solutions); B4320J Semiconductor junction lasers; B2550G Lithography; B2550E Surface treatment and oxide film formation; B0510D Epitaxial growth
CT ALUMINIUM COMPOUNDS; DISTRIBUTED BRAGG REFLECTOR LASERS; ELECTRON BEAM LITHOGRAPHY; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; LIQUID PHASE EPITAXIAL GROWTH; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR JUNCTION LASERS; SPUTTER ETCHING
ST broad-area grating-coupled lasers; III-V semiconductors; DBR lasers; surface emitting lasers; first-order gratings; second-order gratings; chemically assisted ion beam etching; PMMA resist; JEOL 5DIIU direct write electron-beam lithography system; CAIBE; Technics Plasma GmbH RIB 160 etcher; separate confinement double heterostructure layers; liquid-phase epitaxy; surface emitting window regions; far-field light intensity pattern; lateral angular spread; **AlGaAs-GaAs lasers**
CHI AlGaAs-GaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin
ET Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; cp; Ga cp; As cp; As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; V; AlGaAs-GaAs; Al; As; Ga

L26 ANSWER 8 OF 9 INSPEC (C) 2004 IEE on STN
AN 1988:3070495 INSPEC DN A88028200; B88013135
TI GaAs and **AlGaAs** crystallographic etching with low-pressure **chlorine** radicals in an ultrahigh-vacuum system.
AU Sugata, S.; Asakawa, K. (Optoelectron. Joint Res. Lab., Kawasaki, Japan)
SO Journal of Vacuum Science & Technology B (Microelectronics Processing and Phenomena) (July-Aug. 1987) vol.5, no.4, p.894-901. 11 refs.

Price: CCCC 0734-211X/87/040894-08$01.00
CODEN: JVTBD9 ISSN: 0734-211X
DT Journal
TC Experimental
CY United States
LA English
AB GaAs and **AlGaAs** have been crystallographically etched with low-pressure **chlorine** radicals in an electron-cyclotron resonance (ECR) plasma shower with a new reactive-ion-beam etching (RIBE) system for obtaining damage- and contamination-free etching. The etching begins abruptly at 190 degrees C and increases gradually above 200 degrees C. The typical etching rate of a (001) plane is 1 mu m/min at a substrate temperature of 300 degrees C. **Mesa**-shaped and reverse **mesa**-shaped grooves with (111)A side wall planes are obtained for (110)- and (110)-oriented line and space masks. For square masks with (110) edge lines, on the other hand, high aspect-ratio columns with (100) vertical side wall planes are obtained. These results show that the etching rate of (111)A is much lower than that of (100), (110), or (111)B. **AlGaAs** is etched similarly to GaAs. Cl2 gas (not plasma excited) performs similar etching. However, the substrate temperature must be about 100 degrees C higher for the beginning of etching than for the Cl radical etching. These etching technologies are promising for microfabrication of GaAs/**AlGaAs** optoelectronic devices, replacing conventional wet chemical etching.
CC A8160C Semiconductors; B2520D II-VI and III-V semiconductors; B2550E Surface treatment and oxide film formation; B2550G Lithography
CT ALUMINIUM COMPOUNDS; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; SPUTTER ETCHING
ST III-V semiconductors; electron cyclotron resonance plasma; line masks; crystallographic etching; ultrahigh-vacuum system; reactive-ion-beam etching; etching rate; substrate temperature; **mesa-shaped grooves** ; space masks; high aspect-ratio columns; microfabrication; optoelectronic devices; 190 to 300 degC; GaAs; **AlGaAs**; low pressure Cl radicals
CHI Cl el; GaAs sur, As sur, Ga sur, GaAs bin, As bin, Ga bin; AlGaAs sur, Al sur, As sur, Ga sur, AlGaAs ss, Al ss, As ss, Ga ss
PHP temperature 4.63E+02 to 5.73E+02 K
ET As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; C; Cl2; Cl; V; As; Ga; Al

L26 ANSWER 9 OF 9 INSPEC (C) 2004 IEE on STN
AN 1988:3029963 INSPEC DN A88006324; B88002218
TI Nonselective etching of GaAs/**AlGaAs** double heterostructure laser facets by Cl2 reactive ion etching in a load-locked system.
AU Vawter, G.A.; Coldren, L.A.; Merz, J.L.; Hu, E.L. (Dept. of Electr. & Comput. Eng., California Univ., Santa Barbara, CA, USA)
SO Applied Physics Letters (7 Sept. 1987) vol.51, no.10, p.719-21. 9 refs.
Price: CCCC 0003-6951/87/360719-03$01.00
CODEN: APPLAB ISSN: 0003-6951
DT Journal
TC New Development; Experimental
CY United States
LA English
AB Reactive ion etching was used for etching laser facets of GaAs/**AlGaAs** transverse junction **stripe** lasers. A new load-locked reactive ion etching system was developed to dramatically reduce the background partial pressure of O2 and H2O in the chamber, substantially reducing the oxidation of **AlGaAs** and permitting equal rate etching of GaAs and **AlGaAs** with smooth vertical facets. Etching is performed with a **chlorine** plasma at a low pressure (0.5 mTorr), and bias voltage (-350 V) at a rate of approximately 850 AA/min. This simple, single-step dry etching process is suitable for optoelectronic integration and eliminates the requirement of unreliable wet chemical etching or microcleaving techniques. This new system is used to fabricate transverse junction **stripe** lasers with facet

reflectivities of more than 16%. These high quality dry etched facets result in only a 7.5% increase of the threshold current above that of lasers with cleaved facets.

CC A4255P Lasing action in semiconductors with junctions; A4260B Design of specific laser systems; B4320J Semiconductor junction lasers

CT ALUMINIUM COMPOUNDS; GALLIUM ARSENIDE; III-V SEMICONDUCTORS; SEMICONDUCTOR JUNCTION LASERS; SPUTTER ETCHING

ST nonselective etching; fabrication; double heterostructure laser facets; **transverse junction stripe lasers**; load-locked reactive ion etching; dry etching; facet reflectivities; Cl2; **GaAs-AlGaAs**

CHI GaAs-AlGaAs int, AlGaAs int, GaAs int, Al int, As int, Ga int, AlGaAs ss, Al ss, As ss, Ga ss, GaAs bin, As bin, Ga bin; Cl2 el, Cl el

ET As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Al*As*Ga; Al sy 3; sy 3; As sy 3; Ga sy 3; AlGaAs; Al cp; Cl2; O2; H*O; H2O; H cp; O cp; V; GaAs-AlGaAs; Al; As; Ga; Cl

=>